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4/23/2008

Mr. Lance Kruzic
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2900 NW Stewart Parkway
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Lance,

Please find attached Oregon Department of Fish and Wildlife's annual report to NOAA Fisheries regarding fisheries management and evaluation of Willamette River spring Chinook in 2007. This report is an annual requirement of ODFW's *Fisheries Management and Evaluation Plan - Upper Willamette Spring Chinook in Freshwater Fisheries of the Willamette Basin and Lower Columbia River Mainstem* and NMFS' subsequent concurrence letter.

The 2006 Willamette spring Chinook return was 40,500 fish, compared to the preseason expectation of 52,000. The return of about 5,800 wild fish was about 14% of the total run, compared to the 10% preseason expectation. The estimated return of wild fish to the McKenzie River was 3,900 fish. The number of wild fish passing North Fork Dam on the Clackamas River was 1,200 fish. Surveys in the North Santiam River counted 474 Chinook redds.

Lower Columbia and Willamette River recreational fisheries in 2007 were again restricted to retention of adipose-marked hatchery fish only. In the lower Columbia River recreational fishery, 1,600 Willamette hatchery spring Chinook were retained. Lower Willamette River spring Chinook anglers made a total of 74,800 angler trips to catch 7,400 fish, with 5,400 hatchery fish retained. Angler compliance with regulations continues to be high.

Fisheries management in 2007 was complicated by another late-timed upriver spring Chinook return. Four commercial fishery openers targeting spring Chinook occurred in 2007; three in March and one in June. About 875 Willamette hatchery spring Chinook were landed in lower river commercial fisheries.

Freshwater fishery impacts to 2007 Willamette wild spring Chinook were under the 15% maximum established in the FMEP. The estimates by population are 7.8%, 8.1%, and 9.5% for the Clackamas, North Santiam, and McKenzie rivers, respectively.

The 2008 Willamette spring Chinook return is forecasted to be only 34,050 fish, including about 5,100 (15%) wild fish. Based on cohort analyses, about 43% of these (14,800 fish) are expected to be four-year-olds, and 51% (17,200) are expected to be five-year olds. Freshwater recreational and commercial fisheries will remain mark-selective in 2008, and the cumulative

fishery impact is expected to be below the average annual rate of 15% specified in the FMEP. Due to the expected low returns to the Willamette River for 2008, fisheries below Willamette Falls, including the mainstem Columbia River fisheries, will likely be substantially different from fisheries in recent years.

Sincerely,

J. Chris Kern
Assistant Columbia River Fisheries Manager

Attachment

Cc: T. Alsbury (ODFW – N. Willamette District Fish Biologist)
S. Mamoyac (ODFW – S. Willamette District Fish Biologist)
S. Williams (ODFW – Ocean Salmon/Columbia River/Marine Manager)
A. Nigro (ODFW – OSCRP Manager)
J. North (ODFW – Columbia River Fisheries Manager)

Fisheries Management and Evaluation for 2007 Willamette River Spring Chinook

Oregon Department of Fish and Wildlife
Ocean Salmon and Columbia River Program
Columbia River Management

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Introduction

Upper Willamette River wild spring Chinook salmon were listed as a threatened species under the federal Endangered Species Act (ESA) in May 1999. In February 2001, the Oregon Department of Fish and Wildlife (ODFW) submitted a Fisheries Management and Evaluation Plan (FMEP) for upper Willamette River spring Chinook salmon to the National Marine Fisheries Service (NMFS) under limit number 4 of the 4(d) Rule for the upper Willamette River (ODFW 2001).

The NMFS evaluated ODFWs FMEP and determined the FMEP adequately addressed all of the criteria specified in limit number 4 of the 4(d) Rule. Thus, take prohibitions under Section 9 of the ESA and applicable 4(d) Rule do not apply to fishery harvest activities, provided such fisheries are managed in accordance with the FMEP.

The FMEP requires freshwater harvest fisheries for Willamette spring Chinook to be selective for hatchery fish. Willamette hatchery spring Chinook have been mass-marked with an adipose fin clip beginning with the 1997 brood. Based on hatchery release records, about 97% of the age 4-5 hatchery spring Chinook returning in 2007 were adipose fin-clipped. The FMEP limits the total fishery impact on Willamette wild spring Chinook to an annual average rate of 15% or less in combined freshwater fisheries. This fishery impact rate limit ensures the survival and rebuilding of wild populations.

The FMEP indicates that ODFW will complete an annual report that includes a summary of the previous years run, fisheries, spawning escapement, fishery mortality estimates, and fishing plans for the coming year. The report is due to NMFS by January 31 of each year.

2007 Willamette Spring Chinook Run

The estimated 2007 Willamette spring Chinook return was 40,500 fish to the mouth of the Columbia River. This was 33,200 fish less than the 1970-2006 average run of 73,700 fish, and was the third consecutive decline from high runs during 2001-2004 (Table 1 and Figure 1).

The 2007 preseason forecast developed by ODFW was for a return of 52,000 fish entering the Columbia River, which was slightly higher than the 1995-1999 average return of 42,400. The wild portion of the 2007 run was estimated preseason at 10%, or 5,200 fish. Forecasts have generally under-predicted when runs were increasing and over-predicted when runs were decreasing (Figure 2).

The primary basins that support natural production of spring Chinook are the Clackamas, North Santiam, South Santiam, and McKenzie rivers, and the McKenzie is considered to be the most important of these. The Clackamas, North Santiam, and McKenzie rivers were sampled for wild fish escapement in 2007, but dam counts at the Upper and Lower Bennett dams on the North Santiam were discontinued in 2006 due to lack of funding and have not been reinitiated. Angler creel surveys have not been conducted in areas above Willamette Falls since 2004; therefore, 2007 harvest information must be based on angler harvest card returns, which are not currently

available. Harvest estimates from angler harvest cards do not include estimates of released fish, precluding their use in directly estimating impacts to wild fish. For areas above Willamette Falls, estimates of 2007 fishery impacts to wild runs are based upon estimated average encounter rates for hatchery fish in recent years from harvest cards, and an assumed post-release mortality of 12.2% (Lindsay et al. 2003) for wild fish caught and released in recreational fisheries in the Willamette River and tributaries. Because much of the information needed to accurately reconstruct total wild fish escapements are inexact or unavailable, escapement and impact estimates in this report are similarly inexact. As catch card information and other related data become available, annual impact estimates are revised and updated in subsequent annual reports.

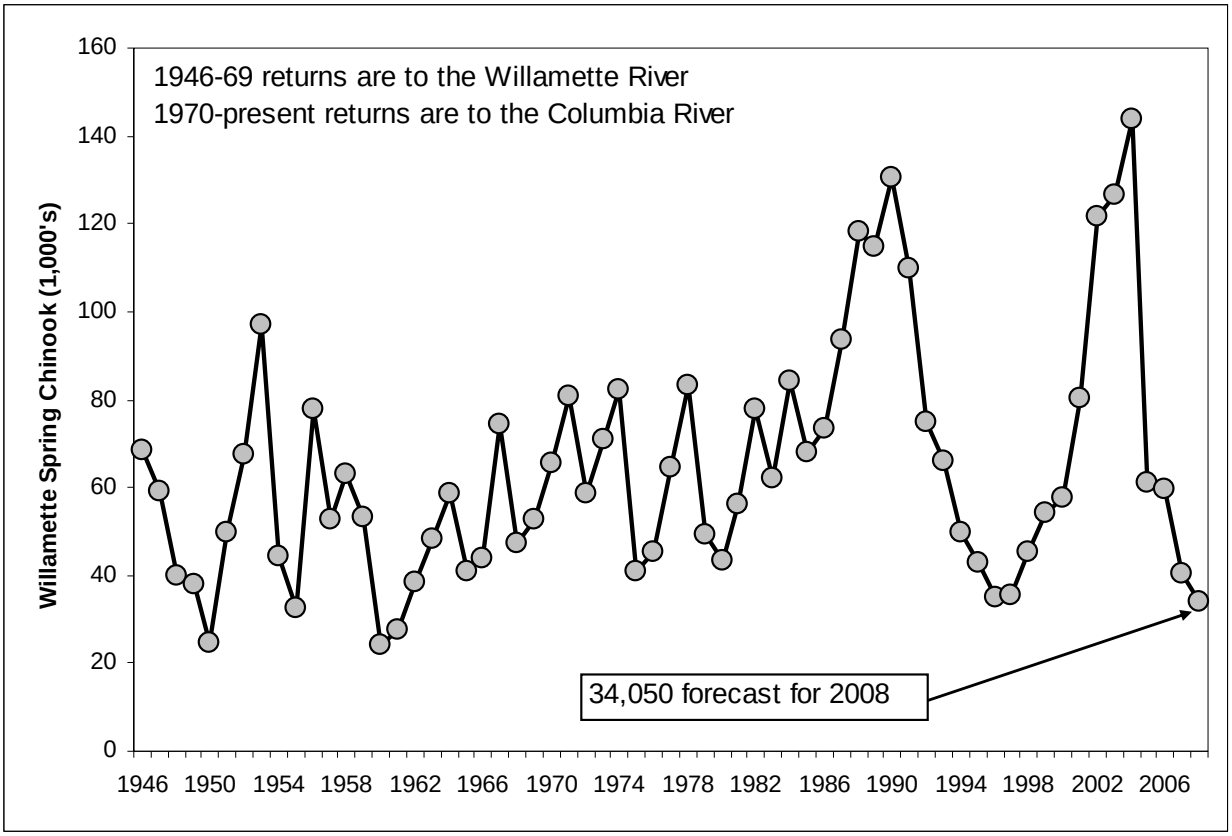

Figure 1. Historic Willamette spring Chinook returns, 1946-2007 and 2008 forecast.

Table 1. Willamette River spring Chinook returns and lower Willamette River recreational harvest, 1946-2007.

Year	Run Entering Columbia	Run Entering Willamette [1]	Falls Count	Mortalities Below Falls [2]	Run Entering Clackamas R.	Lower Willamette Recreational Fishery					
						L. Willamette Recreational Catch [3]	Days Fished [4]	Catch Per Trip	Harvest Rate	Wild Fish Impact	Trips Per Fish
1946		68,600	53,000		3,000	12,600	61,900	0.20	18%		4.9
1947		59,000	45,000		2,000	12,000	91,900	0.13	20%		7.7
1948		40,100	30,000		1,800	8,300	83,600	0.10	21%		10.1
1949		37,900	27,000		1,800	9,100	85,500	0.11	24%		9.4
1950		24,800	14,500		1,500	8,800	73,400	0.12	35%		8.3
1951		49,600	34,300		2,000	13,300	92,600	0.14	27%		7.0
1952		67,500	52,200		2,800	12,500	91,100	0.14	19%		7.3
1953		96,800	76,400		4,000	16,400	102,800	0.16	17%		6.3
1954		44,400	31,100		1,800	11,500	104,100	0.11	26%		9.1
1955		32,500	22,000		1,500	9,000	77,700	0.12	28%		8.6
1956		77,600	58,600		3,000	16,000	84,100	0.19	21%		5.3
1957		52,800	39,300		2,000	11,500	95,500	0.12	22%		8.3
1958		62,800	45,200		2,100	15,500	137,900	0.11	25%		8.9
1959		53,400	31,900		3,000	18,500	134,100	0.14	35%		7.2
1960		24,200	14,400		1,800	8,000	92,300	0.09	33%		11.5
1961		27,500	18,900		2,200	6,400	75,100	0.09	23%		11.7
1962		38,200	26,000	100	3,000	9,100	74,000	0.12	24%		8.1
1963		48,100	30,300	200	4,000	13,600	84,800	0.16	28%		6.2
1964		58,400	36,300		3,500	18,600	118,700	0.16	32%		6.4
1965		41,100	29,100		3,000	9,000	74,000	0.12	22%		8.2
1966		44,000	28,200		3,000	12,800	85,700	0.15	29%		6.7
1967		74,400	56,200		3,000	15,200	92,500	0.16	20%		6.1
1968		47,500	31,500	500	2,000	13,500	91,800	0.15	28%		6.8
1969		52,600	33,700	100	2,500	16,300	99,000	0.16	31%		6.1
1970	65,500	53,500	34,200		1,500	17,700	118,800	0.15	33%		6.7
1971	80,900	67,400	44,600	600	2,200	20,000	112,800	0.18	30%		5.6
1972	58,400	47,100	26,200	200	2,200	18,500	91,200	0.20	39%		4.9
1973	70,700	54,500	42,000	300	2,200	10,000	90,300	0.11	18%		9.0
1974	82,400	71,800	44,500	100	2,200	25,000	154,000	0.16	35%		6.2
1975	40,800	32,800	19,100	100	1,100	12,500	143,800	0.09	38%		11.5
1976	45,100	40,800	22,100	100	2,200	16,400	149,100	0.11	40%		9.1
1977	64,400	58,100	40,000	100	4,000	14,000	126,400	0.11	24%		9.0
1978	83,330	71,400	47,500	100	4,000	19,800	157,600	0.13	28%		8.0
1979	49,200	44,600	26,600	100	5,000	12,800	132,700	0.10	29%		10.4
1980	43,300	42,400	27,000		8,500	7,000	83,600	0.08	17%		11.9
1981	56,300	48,600	30,100		8,000	10,500	124,300	0.08	22%		11.8
1982	78,000	72,500	46,200	100	7,300	18,900	142,900	0.13	26%		7.6
1983	62,200	55,100	30,600	300	10,400	13,800	136,100	0.10	25%		9.9
1984	84,200	74,500	43,500	400	11,300	19,400	136,900	0.14	26%		7.1
1985	68,100	57,100	34,500	400	6,600	15,500	185,600	0.08	27%		12.0
1986	73,600	62,500	39,200	400	7,900	15,000	171,900	0.09	24%		11.5
1987	93,600	82,900	54,800	500	8,700	18,800	173,500	0.11	23%		9.2
1988	118,100	104,000	70,500	200	8,700	24,600	209,700	0.12	24%		8.5
1989	114,900	102,000	69,200	200	8,400	24,200	186,200	0.13	24%		7.7
1990	130,600	106,300	71,300	600	11,500	23,000	200,400	0.11	22%		8.7
1991	109,900	95,300	52,500	400	11,900	30,500	235,800	0.13	32%		7.7
1992	75,000	68,000	42,000	1,000	11,500	13,500	188,500	0.07	20%		14.0
1993	65,900	63,900	32,000	400	10,800	20,700	174,100	0.12	32%		8.4
1994	49,600	47,200	26,100	1,400	7,500	11,500	155,700	0.07	24%		13.5
1995	42,600	42,500	20,600	600	6,600	14,700	145,300	0.10	35%		9.9
1996	34,800	34,600	21,600	1,100	5,900	6,100	63,800	0.10	18%		10.5
1997	35,300	35,000	26,900	400	5,800	1,900	15,000	0.13	5%		7.9
1998	45,100	45,000	34,500	300	7,400	2,800	34,500	0.08	6%		12.3
1999	54,200	53,900	40,400	600	7,400	5,500	45,400	0.12	10%		8.3
2000	57,500	56,100	39,100	300	7,700	11,400 [5]	76,100	0.15	16%	14.0%	6.7
2001	80,400	73,000	54,000	600	10,800	12,400 [6]	101,500	0.12	11%	2.1%	8.2
2002	121,700	109,000	83,100	600	14,400	13,600 [7]	89,400	0.15	10%	3.0%	6.6
2003	126,600	117,600	87,700	700	15,400	16,200 [8]	91,400	0.14	11%	2.4%	5.6
2004	143,700	130,500	96,000	500	21,900	14,600 [9]	110,800	0.13	9%	2.7%	7.6
2005	61,000	55,900	36,600	700	12,700	7,500 [10]	78,700	0.07	10%	3.2%	14.1
2006	59,700	54,900	37,000	300	10,400	8,700 [11]	75,600	0.09	13%	4.2%	10.8
2007	40,468	37,589	23,098	164	8,644	7,439 [12]	74,799	0.10	15%	4.3%	10.1

[1] Tribal fishermen harvested 759, 29, and 12 Chinook at Willamette Falls in 1994, 1995, and 1996 respectively.

[2] Number of mortalities below Willamette Falls includes predation by sea lions. For 1997, 1998, 1999, 2000, 2001, 2002, and 2003, the estimated sea lion take was 141, 150, 348, 138, 70, 143, and 143 respectively.

[3] Catch totals include estimates for the mainstem Willamette bank fishery in 1947, and 1951-2001. Clackamas catch is included from 1950-70 and Eagle Creek catch is included from 1962-70. Clackamas River catch averaged 100 to 200 fish for these years.

[4] No estimate for number of days fished was made for the L. Willamette bank fishery of 1946-74.

[5] Total catch of 11,382 includes 8,712 kept, and 2,670 released. Hook and release mortality estimate is 299.
[6] Total catch of 12,362 includes 6,969 kept, and 5,393 released. Hook and release mortality estimate is 706.
[7] Total catch of 13,635 includes 10,457 kept, and 3,178 released. Wild fish hook and release mortality estimate is 369.
[8] Total catch of 16,200 includes 13,146 kept, and 3,054 released. Wild fish hook and release mortality estimate is 373.
[9] Total catch of 14,600 includes 11,639 kept, and 2,919 released. Wild fish hook and release mortality estimate is 327.
[10] Total catch of 7,500 includes 5,572 kept, and 1,893 released. Wild fish hook and release mortality estimate is 231.
[11] Total catch of 8,700 includes 7,027 kept and 1,648 released. Wild fish hook and release mortality estimate is 203.
[12] Total catch of 7,439 includes 5,439 kept and 2,000 released. Wild fish hook and release mortality estimate is 244.

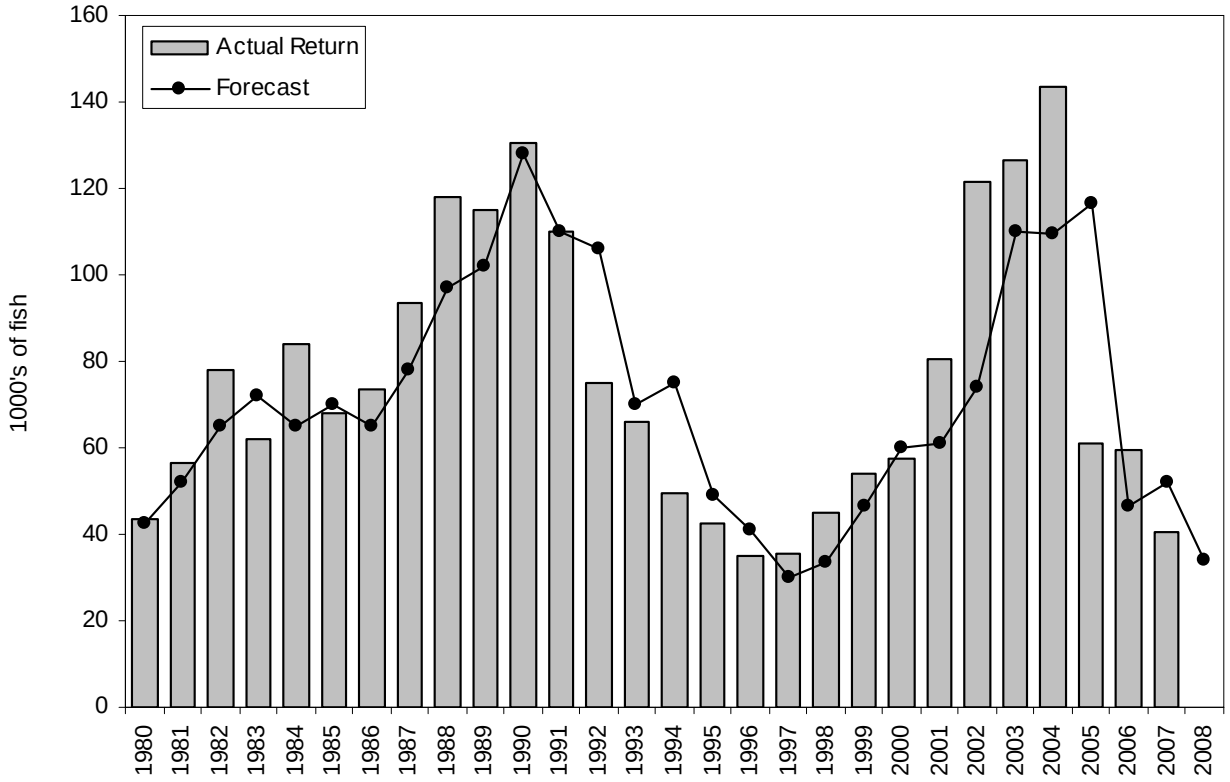

Figure 2. Predicted and observed Willamette River spring Chinook returns to the Columbia River mouth, 1980-2007.

Columbia River Return

The estimated return to the Columbia River mouth in 2007 was 40,468 fish (Table 2). The return was comprised of the following age classes:

	No.	%
Age 3	525	1.3
Age 4	14,192	35.1
Age 5	24,702	61.0
Age 6	1,049	2.6
Total	40,468	

Clackamas River Return

The estimated return to the Clackamas River in 2007 was 8,644 fish (Table 2). The return was comprised of the following age classes:

	No.	%
Age 3	175	2.0
Age 4	2,551	29.5
Age 5	5,847	67.7
Age 6	71	0.8
Total	8,644	

The return to North Fork Dam on the Clackamas River in 2007 was 4,460 adult fish (Table 3 and Figure 3). Sampling by Portland General Electric staff showed the return to be 2,805 (63%) marked hatchery fish and 1,655 unmarked fish. Adipose fin-clipped fish were not allowed to pass the dam to reach natural spawning areas. Sampling by ODFW staff from 2001-2006 to examine unmarked fish for thermal otolith marks has revealed that, on average, only 73% of unmarked fish at North Fork Dam are natural origin fish. This analysis has not been completed for the 2007 run yet, so we applied the average percentage of wild fish (73%) to the unmarked fish seen at North Fork Dam, to estimate that 1,208 wild fish returned to the dam. Of the marked hatchery fish returning to the dam, 554 adults were recycled downstream to pass upstream again through the recreational fishery. Although many were hauled multiple times, few were caught in the fishery. Another 2,266 marked adults were taken directly to Clackamas Hatchery. Based on preliminary run reconstructions (Table 4), of the 8,469 adult Chinook that returned to the Clackamas River in 2007 (Table 5), about 15% (1,228 fish) were wild fish.

An escapement of 1,655 unmarked fish at North Fork Dam is 57% of the full seeding goal of 2,900 fish contained in the Clackamas River Basin Fish Management Plan for Spring Chinook (ODFW 1998).

Table 2. 2007 Willamette River Spring Chinook Return.

Catch	Age 3	Age 4	Age 5	Age 6	Total
LCR Commercial (landed catch)	0	109	750	16	875
LCR Commercial (release. mortality)	0	7	68	2	78
SAF Commercial[1]	0	83	234	0	317
LCR Recreational (kept catch)	8	413	1,122	19	1,562
LCR Recreational (release mortality)	0	13	34	1	47
L. Will. Recreational Fishery (kept catch)	57	1,689	3,505	188	5,439
L. Will. Recreational Fishery (rel. mortality)[2]	3	76	157	8	244
Lower Clackamas Recreational (kept catch)	10	50	151	0	211
Lower Clackamas Recreational (rel. mortality)[2]	0	2	5	0	7
Total	78	2,442	6,026	234	8,780
Escapement					
Willamette Falls Count[3]	280	9,188	12,891	739	23,098
Mortality Below Falls	0	11	22	1	34
Clackamas Hatchery Return[3,4]	111	1,813	4,130	52	6,106
Eagle Creek Hatchery Return[3,5]	1	1	2	0	4
North Fork Dam, Passed Upstream[3,6]	42	502	1,144	14	1,702
North Fork Dam, Recycled Downstream[3,7]	10	168	381	5	564
Natural Spawn Bel. N.F. Dam	1	15	34	0	50
Sea Lion Predation[8]	2	52	72	4	130
Total	447	11,750	18,676	815	31,688
Run Entering Columbia	525	14,192	24,702	1,049	40,468
Percent	1.3%	35.1%	61.0%	2.6%	
Run Entering Willamette	517	13,567	22,494	1,011	37,589
Percent	1.4%	36.1%	59.8%	2.7%	
Run Entering Clackamas	175	2,551	5,847	71	8,644
Percent	2.0%	29.5%	67.6%	0.8%	

[1] *Includes 274 fish from Youngs Bay and 43 fish from Blind Slough. (Hatchery and wild fish combined total)*

[2] *Release mortality rate from Lindsey et. al. (12.2% of released fish).*

[3] *Uses actual counts for jacks.*

[4] *Includes 2,307 hatchery fish returned to Clackamas Hatchery from N. Fork Dam trap.*

[5] *USFWS estimate of fish returning to Eagle Creek Hatchery. Fish do not enter hatchery.*

[6] *Includes 12 mortalities from wild fish collected at N. Fork Dam trap.*

[7] *Includes 15 mortalities from hatchery fish collected at N. Fork Dam trap.*

[8] *Average of most recent five year period.*

[9] *Age composition based on scale analysis of Willamette River sport catch.*

[10] *Age composition based on scale analysis of Clackamas River sport catch.*

[11] *Age composition based on scale analysis of hatcheries above Willamette Falls.*

[12] *Age composition based on scale analysis of Clackamas Hatchery returns.*

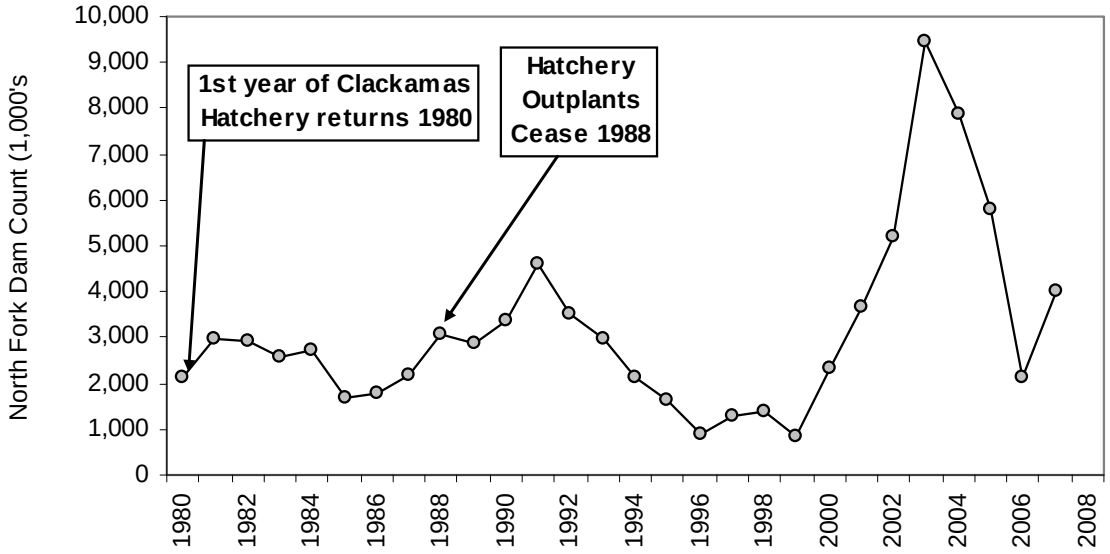

Figure 3. Spring Chinook returns to North Fork Dam, 1980-2007.

Table 3. 1998-2007 adult Spring Chinook returns to North Fork Dam, Clackamas River, Oregon.

Year	Unclipped[1]	Marked Hatchery[1]	Total Adults
1998			1,395
1999			857
2000	1,927	200	2,127
2001	2,365	1,302	3,667
2002	2,171	3,558	5,729
2003	3,364	6,115	9,479
2004	5,176	7,854	13,030
2005	2,882	2,904	5,786
2006	1,049	1,088	2,137
2007	1,655	2,805	4,460

[1] *Prior to implementation of full mark-selective fisheries, less than 100% of hatchery fish were marked. Since implementation of mark-selective fisheries, about 2% of hatchery fish have been marked with CWT but no fin clip (double index tagging or DIT). Therefore, unclipped numbers do not necessarily reflect only wild fish in years with DIT returns. DIT was discontinued in 2004.*

Table 4. Run reconstruction for wild and hatchery spring Chinook (adults only), and fishery impacts to wild run, Clackamas River, 2002-2007.

	Wild				Hatchery							
	Dam Count	Nat. Spawn	Rel. Mort.	Total	Dam Count	Nat. Spawn	Harvest	Hatchery Returns	Total	Total Run	%Wild	Wild Impact[1]
2002	1,505	14	136	1,655	4,224	35	2,529	6,235	13,023	14,677	11%	8.22%
2003	2,637	125	34	2,796	6,843	323	1,220	3,308	11,694	14,490	19%	1.22%
2004	4,053	498	30	4,581	3,932	484	1,379	11,395	17,190	21,771	21%	0.65%
2005	1,790	217	38	2,045	4,017	486	1,249	4,714	10,466	12,511	16%	1.86%
2006	798	205	14	1,017	1,339	345	397	7,247	9,328	10,345	10%	1.38%
2007	1,208	13	7	1,228	3,272	36	201	3,732	7,241	8,469	15%	0.57%

[1] *Impact is for lower Clackamas River fishery only.*

Table 5. Estimated return of adult spring Chinook to the Clackamas River, 1979-2007.

	L. Clackamas Recreational Catch		North Fork Dam Count		Natural Spawn	Hatchery Return		
Year	Kept	Released (est. mort.)	Passed	Not Passed	Below N.F. Dam	Eagle Ck. NFH	Clackamas	Total Return
1979	1,142		592		148	2,759	0	4,642
1980	2.991		2,122		590	1,448	1,024	8,175
1981	2,238		2,987		627	811	1,065	7,728
1982	2,379		2,910		196	886	563	6,934
1983	4,283		2,598		728	466	1,725	9,800
1984	4,128		2,733		576	977	2,483	10,897
1985	2,394		1,694		613	670	896	6,267
1986	3,685		1,797		567	587	755	7,391
1987	3,078		2,159		838	1,338	964	8,377
1988	2,709		3,089		200	1,360	1,236	8,594
1989	2,594		2,853		530	1,137	820	7,904
1990	4,522		3,388		576	866	1,776	11,128
1991	3,769		4,583		491	88	2,626	11,557
1992	2,681		3,512		746	0	4,415	11,354
1993	2,767		2,985		187	0	4,564	10,503
1994	1,512		2,152		98	9	3,646	7,417
1995	1,592		1,638		140	18	3,049	6,437
1996	1,809		888		97	2	2,975	5,771
1997	1,673		1,264		145	0	2,624	5,706
1998	1,232		1,395		95	4	4,446	7,192
1999	1,862		857		98	4	4,522	7,343
2000	1,148		2,127		97	8	4,155	7,535
2001	630	582 (71)	2,365	1,302	49	3	6,010	10,430
2002	2,488	1,115 (136)	2,171	3,558	48	15	6,220	14,636
2003	1,205	279 (34)	3,364	6,115	448[1]	9	3,299	14,474
2004	1,316	246 (30)	5,176	7,854	982	296	11,099	26,753
2005	1,240	311 (38)	2,882	2,914	703	250	4,464	12,491
2006	397	115 (14)	1,049	1,088	550	3	7,244	10,345
2007	201	57 (7)	1,660	2,820	49	3	3,729	8,469

[1/] *Staff estimates only 125 adults may have spawned; the remainder were prespawning mortalities.*

North Santiam River Return

The 2001-2005 North Santiam spring Chinook returns were monitored at Upper and Lower Bennett dams by ODFW staff (Table 6). Due to funding shortages, the 2006 run was not monitored at these locations, and counts have not been reinitiated. Nearly all hatchery fish returning in 2007 were adipose fin-clipped. All hatchery fish were also thermally otolith marked prior to release (Schroeder et al., 2002).

Because dam counts for the North Santiam are not available for the 2006 and 2007 runs, we interpolated the counts based on past data. From 2001-2005, counts of total fish to the North Santiam ranged from 12.6% to 20.9% of the total passage at Willamette Falls, and averaged 15.2%. If the average held true for 2006 and 2007, the total return of adult Chinook to the North Santiam would be expected to be 5,921 fish for 2006 and 3,692 fish for 2007 (Table 7). During 2001-2005, an average of 94.6% of fish returning to the North Santiam were hatchery fish (Table 7). Applying this percentage to the interpolated total returns for 2006 and 2007 yields an estimate of 5,568 hatchery fish for 2006 and 3,472 hatchery fish for 2007. The remainder of the run was assumed to be wild. Harvest impacts for wild fish are calculated as the average encounter rate for hatchery fish for North Santiam fisheries from 2001-2005 catch card information multiplied by the estimated North Santiam wild fish return, with the product then multiplied by 12.2% release mortality.

Redd counts of spring Chinook salmon in the North Santiam River and the Little North Fork Santiam in 2007 were the second highest since 1997 (Table 8). Redd counts for the area below Bennett dams were not conducted in 2007, so we used the 2003-2006 average number of redd counts multiplied by the 2002-2003 average fish per redd to estimate the number of fish that spawned below Bennett dams. The 2002-2003 average fish per redd was used because 2005-2006 data were not available, and the 2004 fish per redd estimate appeared to be inordinately high compared to 2002-2003. The 2002-2003 average may therefore be a conservative estimate of the number of fish per redd.

Based on a preliminary run reconstruction, (Table 7) the mainstem North Santiam wild run in 2007 was estimated at 221 adults and 6.0% of the total return to the Columbia River mouth.

Table 6. Adult spring Chinook counts at Bennett dams, adjusted for non-clipped hatchery returns, 2001-2005. Counts were not available for 2006 and 2007.

	Adult Dam Count			% Non-clipped carcasses with thermal marks	Estimated Adults		Adjusted Percent Wild
Year	Non-clipped	Clipped	Total		Wild	Hatchery	
2001	388	6,398	6,786	43.4	220	6,566	3
2002	1,233	6,407	7,640	51.0	604	7,036	8
2003	1,262	11,570	12,832	78.5	271	12,561	2
2004	1,510	12,021	13,531	67.6	489	13,042	4
2005	924	3,959	4,883	27.8	667	4,216	14

Table 7. Run reconstruction for wild and hatchery spring Chinook (adults only), and fishery impacts to wild run, North Santiam River, 2002-2007.

	Wild Run				Hatchery Run						
	Dam Count	Nat. Spawn	Rel. Mort.	Total	Dam Count	Nat. Spawn	Harvest	Total	Total Run	Wild %	Wild Impact[1]
2002	604	32	21	657	7,036	80	2,721	9,837	10,494	6.3%	3.21%
2003	271	7	103	846[3]	12,561	64	4,903	17,528	18,374	4.6%	12.20%
2004	489	17	48	553	13,042	53	2,973	16,068	16,621	3.3%	8.64%
2005	667	7	7	681	4,215	25	411	4,651	5,332	12.8%	1.07%
2006[2]	337	8	8	354	4,426	31	1,076	5,568	5,921	6.0%	2.36%
2007[2]	208	8	5	221	2,750	30	671	3,472	3,692	6.0%	2.36%

[1] *Impact applies only to fisheries in the North Santiam.*
[2] *Dam counts and angler harvest card data are unavailable for 2006 and 2007. See text for interpolation methods*
[3] *Total fishery handle of wild fish was 846 fish. Total was increased to 846 as a minimum estimated return.*

Table 8. Redd counts of spring Chinook salmon in the North Santiam River, 1997-2007.

	Number of Redds								
Area	1997	1998	2001	2002	2003	2004	2005	2006	2007
Mainstem North Santiam: Stayton to Minto	106	150	286	266	630	283	240	202	410
Little North Fork of the Santiam	10	38	18	30	31	51	61	34	64
Total	116	188	304	296	661	334	301	236	474

McKenzie River Return

The minimum 2007 return to the McKenzie River was 6,854 adult Chinook (Table 9, Figure 4). The 2007 Leaburg Dam count was comprised of 2,757 non-fin-clipped adults and 558 adipose-fin-clipped hatchery adults (Table 10). The preliminary unmarked fish escapement of 2,757 fish above Leaburg Dam is slightly less than the escapement goal of 3,000-5,000 fish specified in the McKenzie River Basin Fish Management Plan for Spring Chinook (ODFW 1998). Based on preliminary run reconstructions (Table 11), an estimated 3,874 of the 2007 run were wild fish (51%).

Table 9. Estimated return of adult spring Chinook to the McKenzie River, 1970-2007.
(Estimated total return will not match Table 11 due to differences in calculations of wild fish at Leaburg Dam and natural spawning below Leaburg Dam.)

Run Year	Leaburg Dam Count	McKenzie Hatchery Return	Recreational Catch: Above Leaburg Dam	Recreational Catch: Below Leaburg Dam	Recreational Catch: Total	Est. Natural Spawn Below Leaburg Dam: Redds	Est. Natural Spawn Below Leaburg Dam: No. Fish[1/]	Total Return
1970	2,991	20	--	--	525	278	1,251	4,787
1971	3,602	232	--	--	621	415	1,868	6,323
1972	1,547	301	--	--	1,125	177	797	3,770
1973	3,870	56	--	--	1,510	556	2,502	7,938
1974	3,717	0	--	--	1,022	689	3,101	7,840
1975	1,374	0	--	--	461	346	1,557	3,392
1976	1,899	396	--	--	139	409	1,841	4,275
1977	2,714	1,517	--	--	1,071	850	3,825	9,127
1978	3,058	1,464	--	--	924	599	2,696	8,142
1979	1,219	798	--	--	303	155	698	3,018
1980	1,980	807	--	--	381	219	986	4,154
1981	1,078	784	--	--	493	282	1,269	3,624
1982	2,241	1,460	--	--	627	241	1,085	5,413
1983	1,561	821	15	206	221	172	774	3,377
1984	1,000	1,901	51	567	618	271	1,220	4,739
1985	825	1,923	8	459	467	381	1,715	4,930
1986	2,061	1,705	29	354	383	315	1,418	5,567
1987	3,455	1,593	29	1,339	1,368	212	954	7,370
1988	6,753	2,487	86	1,133	1,219	484	2,178	12,637
1989	3,981	3,154	134	1,730	1,864	228	1,026	10,025
1990	7,226	3,206	315	1,387	1,702	160	720	12,854
1991	4,359	4,483	64	1,922	1,986	161	725	11,553
1992	3,816	3,407	81	1,195	1,276	106	477	8,976
1993	3,629	2,051	80	1,761	1,841	142	639	8,160
1994	1,526	701	13	486	499	59	266	2,992
1995	1,622	1,135	24	84	108 [2/]	66	297	3,162
1996	1,445	1,573	58	244	302 [2/]	71	320	3,640
1997	1,176	1,524	0	0	0 [3/]	90	405	3,105
1998	1,874	1,690	0	0	0 [3/]	95	428	3,992
1999	1,909	2,279	0	0	0 [3/]	82	369	4,557
2000	2,657	3,553	0	0	0 [3/]	132	594	6,804
2001	4,428	3,920	27	447	474	100	450	9,272
2002	6,087 [4/]	6,832	86	1,726	1,812	115	518	15,249
2003	9,327 [5/]	6,171	24	1,223	1,247	171	770	17,515
2004	9,043	4,752	31	2,663	2,694	99	446	16,935
2005	3,108	3,199	37	597	634	75	338	7,279
2006	3,170	3,026	--	--	765 [6/]	72	324	7,285
2007	3,315	2,348	--	--	571 [6]	141	635	6,869

[1/] *Estimated Natural Spawn below Leaburg Dam = No. of Redds below Leaburg Dam X 4.5 Fish/Redd.*
[2/] *Adipose fin-clipped hatchery fish only allowed to be retained.*
[3/] *Closed season.*
[4/] *An additional 690 adipose fin-clipped hatchery fish were removed from Leaburg Dam ladder and hauled and released primarily above Cougar Dam into the South Fork McKenzie River.*
[5/] *An additional 1,197 adipose fin-clipped hatchery fish were removed from Leaburg Dam ladder and hauled and released primarily above Cougar Dam into the South Fork McKenzie River.*
[6/] *Estimated from mean harvest rate from 2002-2005.*

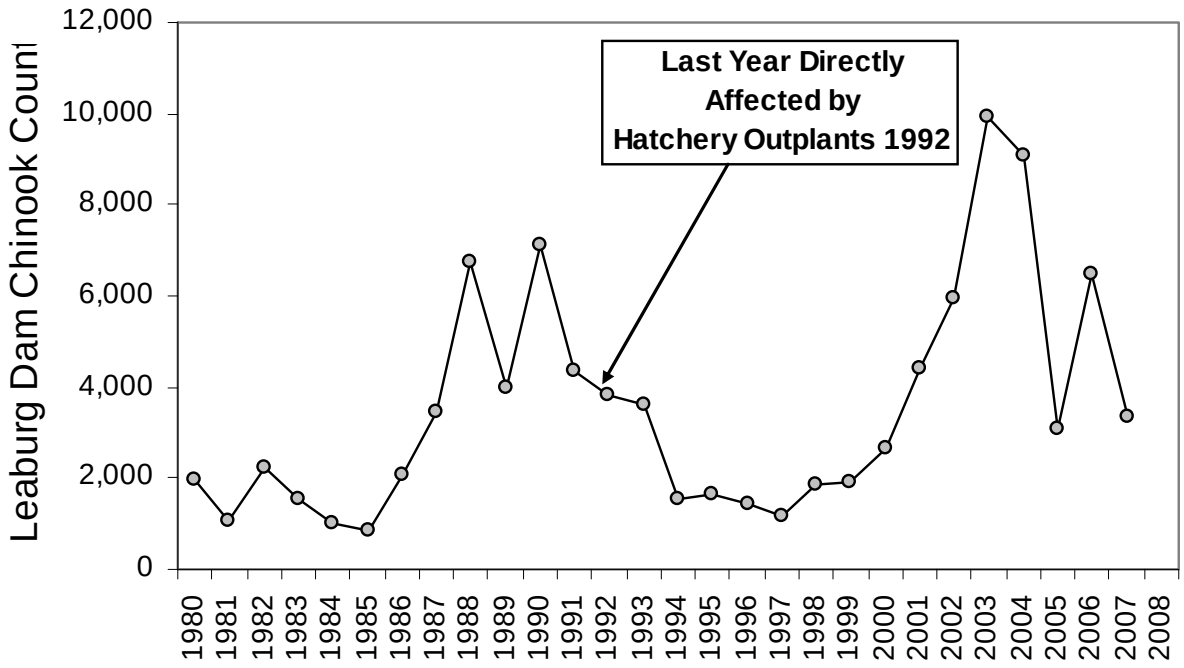

Figure 4. Spring Chinook returns to Leaburg Dam (McKenzie River), 1970-2007.

Table 10. Adult spring Chinook counts at Leaburg Dam on the McKenzie River, 1994-2007.

Year	Wild/Unmarked		Hatchery/Marked		Total
	Number	Percent	Number	Percent	
1994	825	54	701	46	1,526
1995	933	58	689	42	1,622
1996	1,105	76	340	24	1,445
1997	991	84	185	16	1,176
1998	1,415	76	459	24	1,874
1999	1,383	72	526	28	1,909
2000	1,985	75	672	25	2,657
2001	3,433	80	869	20	4,297
2002	4,223 [1/]	69	1,864	31	6,087 [2/]
2003	5,784 [1/]	62	3,543	38	9,413 [3/]
2004	4,788	53	4,246	47	9,052
2005	2,579	83	515	17	3,148
2006	2,225	70	945	30	3,170
2007	2,757	83	558	17	3,315

[1/] *Includes a preliminary estimate of 18% non-adipose-fin-clipped fish that were found to have otolith marks indicating they were reared in a hatchery.*

[2/] *An additional 690 adipose fin-clipped hatchery fish were removed from Leaburg Dam ladder.*

[3/] *An additional 1,197 adipose fin-clipped hatchery fish were removed from Leaburg Dam ladder.*

Table 11. Run reconstruction for wild and hatchery spring Chinook (adults only), and fishery impacts to wild run, McKenzie River, 2002-2007.
(Estimated total return will not match Table 9 due to differences in calculations of wild fish at Leaburg Dam and natural spawning below Leaburg Dam.)

	Wild Run				Hatchery Run							
	Dam Count	Nat. Spawn	Rel. Mort.	Total	Dam Count	Nat. Spawn	Hatchery Harvest	Hatchery Returns	Total	Total Run	Wild %	Wild Impact[1]
2002	3,602	599	96	4,297	2,485	413	1,812	6,768	11,478	15,775	27%	2.24%
2003	4,899	790	88	5,777	4,428	714	1,487	6,171	12,800	18,577	31%	1.52%
2004	4,419	426	237	5,082	4,615	445	3,081	6,603	14,744	19,827	26%	4.67%
2005	2,435	519	57	3,011	659	141	634	3,213	4,647	7,658	39%	1.89%
2006	2,189	438	59	2,685	981	196	765	3,000	4,942	7,628	35%	2.19%
2007	2,757	1,032	85	3,874	558	209	571	2,348	3,686	7,559	51%	2.19%

[1] *Impacts apply to fisheries in the McKenzie River only.*

2007 Fisheries

The Willamette FMEP, implemented in 2001, calls for mark-selective fisheries for hatchery spring Chinook. Beginning in 2001, only adipose fin-clipped spring Chinook were allowed to be retained in freshwater recreational fisheries. Mark-selective freshwater commercial fisheries followed beginning in 2002. All unmarked fish must be released unharmed in these fisheries. The goal of Willamette Basin fishery management for spring Chinook is to limit fishery impacts on wild fish to levels that ensure the survival and rebuilding of wild populations while providing fishery access to abundant hatchery fish. An average annual impact rate of less than 15% in combined freshwater fisheries in the Willamette Basin and lower Columbia was established to achieve this goal. Fisheries in 2007, and expectations for 2008, are described in detail in ODFW/WDFW 2008.

The 2007 preseason forecast for Willamette River spring Chinook was for a total of 52,000 fish to the Columbia River mouth, and 10% of those were expected to be wild fish, leaving 46,800 hatchery fish in the expected return. According to the Willamette FMEP, the 46,800 hatchery fish return, minus escapement and hatchery broodstock needs for the Clackamas River and areas above Willamette Falls, left a projected harvestable surplus of 20,700 hatchery fish. This surplus was to be allocated 80% (16,560 fish) to recreational fisheries downstream of Willamette Falls, including the lower Columbia River, and 20% (4,140 fish) to commercial fisheries in the lower Columbia River, including Select Area fisheries.

The majority of catch in these fisheries occurs well before the peak of migration over Willamette Falls and up the Clackamas River. This late migration precludes early updating of the run size for use in inseason management. These fisheries are most often managed based on preseason expectations. Based on the post-season run reconstruction, only 35,000 hatchery fish returned in 2007. The allocations for that size return are 12,000 fish for the recreational fishery below Willamette Falls and 350 fish for the commercial fishery in the lower Columbia River. Although the commercial fishery exceeded this allocation of Willamette River hatchery fish by 765 fish, these fish were harvested before any management action would have been possible. In total, 8,134 hatchery Willamette spring Chinook were harvested below Willamette Falls, compared to the post-season limit of 12,350 fish, representing only 66% of the available allocation for both fisheries combined. Since recreational fisheries below Willamette Falls in 2007 harvested only 58% of their post-season allocation, neither these fisheries nor the fisheries above Willamette

Falls were restricted to account for the exceeded commercial allocation, and the total harvest from all fisheries below Willamette Falls was within the limits specified in the FMEP.

Fisheries impacting wild Willamette spring Chinook in 2007 were managed successfully below the 15% impact rate limit. Table 12 provides 2007 catch estimates by fishery and fishery impact estimates on three populations of Willamette wild spring Chinook. Spring Chinook stock separations in Columbia River fisheries were made through visual stock identification and coded-wire-tag analyses. The mortality rate for released salmon in Columbia River recreational fisheries is assumed to be 10%. Estimated commercial fishery release mortality rates for spring Chinook are 40% in large-mesh gill nets and 18.5% in tangle nets (ODFW/WDFW 2008). In the Willamette Basin, the lower Willamette and lower Clackamas recreational fisheries have been sampled for many years. Recreational fisheries above Willamette Falls were not sampled in 2005-2007, and estimated impacts to wild fish are derived from analysis of encounter rates of hatchery fish in these fisheries. The estimated mortality rate for released fish in all Willamette Basin recreational fisheries is 12.2% (Lindsay et al. 2003). The total freshwater fisheries impact on wild Willamette River spring Chinook in 2007 was 9.7% for the entire wild run. For specific populations, the impact was 7.7% for Clackamas, 8.1% for North Santiam, and 9.5% for McKenzie populations (Table 12).

Lower Columbia Commercial Fishery

The 2007 lower Columbia River spring Chinook commercial fishery was selective for adipose fin-clipped hatchery fish requiring all non-adipose fin-clipped fish be released. This was the seventh year for a mark-selective commercial fishery, although participation in 2001 was restricted to only 20 fishers. Since 2002, the fishery has been open to all licensed fishers who have completed mandatory training on live-capture fishing techniques. An estimated total of 42 Willamette hatchery spring Chinook were landed as incidental catch in 2007 winter sturgeon fisheries. The remaining estimated 833 Willamette hatchery fish harvested in mainstem commercial fisheries were landed in three target Chinook seasons. One of these seasons utilized 8” mesh gear, and two utilized 4¼” tangle net gear. Target Chinook fisheries are restricted to 45-minute maximum drift time, and mandatory use of recovery boxes to revive lethargic and bleeding fish regardless of net type used. Large mesh was required in the February-early March portion of the fishery and during a brief June opener to limit steelhead interceptions while targeting hatchery spring Chinook. Tangle nets were used in late March. The fishery was managed to limit impacts to ESA-listed wild Willamette spring Chinook, listed spring Chinook destined for above Bonneville Dam, and listed steelhead. Additionally, agreements for allocation of Willamette River hatchery spring Chinook between the recreational and commercial fisheries downstream of Willamette Falls were in place (ODFW/WDFW 2007). The 2007 commercial fishery was sampled by on-board monitors and at fish buying stations.

All unmarked fish released by fishers are assumed to be wild fish. A detailed accounting of the effects of including unmarked hatchery fish in this group has not yet been conducted. The fishery harvested 2,905 hatchery spring Chinook and released 744 non-adipose fin-clipped spring Chinook. The estimated Willamette spring Chinook catch was 875 marked hatchery fish retained and 308 unmarked fish released. The estimated release mortality of the mainstem commercial fishery was 77 adult Willamette wild spring Chinook, or 1.3% of the wild return to the Columbia River mouth.

Select Area Fisheries

Fisheries for net-pen-reared spring Chinook occurred in 2007 in Youngs Bay, Blind Slough/Knappa Slough, and Deep River. The Tongue Point/South Channel fishery was closed because of a high interception rate of upriver spring Chinook in past seasons. Select Area fisheries are not restricted to retention of only adipose fin-clipped fish. These off-channel net pen and fishing sites are dominated by returns of local spring Chinook. A total of 6,774 spring Chinook were caught in 2007 SAFE fisheries including an incidental catch of 317 Willamette spring Chinook. Twenty-four percent of this catch was estimated to be comprised of unmarked fish, therefore the estimated mortality of Willamette wild spring Chinook was 77 adult fish or 1.3% of the total wild return. The proportion of non-local fish (not Select Area stock) landed in 2007 was similar to the long term average.

Lower Columbia Recreational Fishery

For the seventh consecutive year, the lower Columbia River recreational fishery was open for the majority of the spring to retention of adipose fin-clipped hatchery spring Chinook, targeting an upriver spring Chinook return of 86,200 fish, and an overall spring Chinook return of all stocks of 151,000 fish.

The 2007 lower Columbia recreational fishery from Tongue Pt. to the I-5 Bridge was open seven days per week January 1-April 15, and May 16-June 15. The recreational fishery from above I-5 Bridge to Bonneville Dam was open June 6-15. The fishery from Bonneville Dam upstream to McNary Dam was open from March 16-May 3 and from June 6-15. The total catch for the 2007 spring Chinook fishery below Bonneville Dam was 8,124 adult spring Chinook (6,476 kept and 1,648 released) from 83,010 angler trips.

Catch estimates are derived from creel surveys and all unmarked fish released by anglers are assumed to be wild fish. A detailed accounting of the effects of including unmarked hatchery fish in this group has not yet been conducted. Of the 2007 kept catch, an estimated 1,562 adipose fin-clipped adult Willamette hatchery fish were retained, and 475 non-clipped Willamette fish were released. The estimated mortality of Willamette wild spring Chinook was 48 adult fish, or 0.8% of the wild return.

Lower Willamette Recreational Fishery

The 2007 lower Willamette recreational fishery was open seven days per week the entire year to retention of adipose fin-clipped Chinook. This was the sixth year of full implementation of a mark-selective spring Chinook fishery. Partial season mark-selective fisheries occurred in 2000 and 2001.

ODFW Research and District staff conducted a study of post-release mortality of Chinook in the lower Willamette recreational fishery during 1998-2000 (Lindsay et al. 2003). Estimates of hooking mortality by anatomical hook locations were made from catch and release of recreational caught fish immediately below Willamette Falls and compared to uncaught fish in a control situation from a trap in the Willamette Falls fishway. Meanwhile, ODFW fish checkers in the lower Willamette recreational fishery noted anatomical hooking locations from landed

Chinook. Applying the estimates of hooking mortality rates made at Willamette Falls to the distribution of hook locations in the recreational fishery provided an estimated 12.2% catch-and-release hooking mortality in the lower Willamette river recreational fishery. The 12.2% rate has been used to estimate the fishery impact on released fish in the lower Willamette River and Willamette tributary recreational fisheries since 2002.

Catch estimates are derived from creel surveys and all unmarked fish released by anglers are assumed to be wild fish. A detailed accounting of the effects of including unmarked hatchery fish in this group has not yet been conducted. A total of 74,800 angler trips were made to catch 7,357 adult spring Chinook in 2007; 5,382 (73%) were kept adipose fin-clipped adults and 1,957 (27%) were released non-adipose-fin-clipped adults. The estimated impact on Willamette wild spring Chinook was 241 adult fish, or 4.1% of the wild return to the Columbia River mouth.

Clackamas Recreational Fishery

The 2007 lower Clackamas River spring Chinook recreational fishery was open seven days per week the entire year for the seventh consecutive year and was restricted to adipose fin-clipped Chinook.

Catch estimates are derived from creel surveys and all unmarked fish released by anglers are assumed to be wild fish. A detailed accounting of the effects of including unmarked hatchery fish in this group has not yet been conducted. A total of 4,700 angler trips caught and retained 201 adipose fin-clipped adults and released 57 non-adipose-fin-clipped adults. The estimated mortality of adult Clackamas wild spring Chinook was 7 adult fish, or 0.1% of the wild return of the wild return to the mouth of the Columbia River (0.6% of the Clackamas River wild return).

Upper Willamette Mainstem Recreational Fishery

The 2007 upper Willamette mainstem recreational fishery (from the falls upstream to the mouth of the McKenzie River) was restricted to retention of adipose fin-clipped Chinook the entire year. The recreational fishery in the upper Willamette is generally smaller than the fishery in the lower Willamette, and has not been sampled since 2004. Estimates of mortality of adult wild spring Chinook in the upper Willamette were made using average encounter rates of hatchery Chinook derived from angler harvest cards for the most recent available years. Because this method calculates the number of wild fish released based on encounter rates, the estimate should not be influenced by unmarked hatchery fish being counted in the catch, as is the case with estimates generated by creel surveys. The estimated 2007 mortality of upper Willamette wild spring Chinook was 23 adult fish, or 0.41% of the wild return to the mouth of the Columbia River.

Upper Willamette Tributary Recreational Fisheries

All tributary recreational fisheries in the Willamette Basin have been restricted to retention of adipose fin-clipped spring Chinook since 2002. Angler surveys are not conducted in these areas. Estimates of impacts on Willamette wild spring Chinook in the North Santiam and McKenzie rivers were made using average encounter rates of hatchery Chinook derived from angler harvest cards for the most recent available years. Because this method calculates the number of wild fish

released based on encounter rates, the estimate should not be influenced by unmarked hatchery fish being counted in the catch, as is the case with estimates generated by creel surveys. The estimated 2007 mortality of wild spring Chinook in the North Santiam and McKenzie rivers were 5 adult fish and 85 adult fish, respectively, or 0.09% and 1.96% of the wild return to the mouth of the Columbia River.

Table 12. 2007 adult Willamette spring Chinook freshwater catches and impacts on wild fish returns.

Fishery	Catch		Wild Fish Mortalities [1/]	Percentage Impact on Wild Return [2/]
	Kept	Released		
Lower Columbia Commercial	875	308	77	1.33%
Select Area Commercial	317	0	76	1.32%
Lower Columbia Recreational	1,562	475	48	0.83%
Lower Willamette Recreational	5,382	1,975	241	4.16%
	8,136	2,758	442	7.64%
Clackamas Recreational	201	57	7	0.12%
Upper Willamette Recreational	137	74	23	0.39%
North Santiam Recreational	549	33	5	0.09%
McKenzie Recreational	556	607	85	1.46%
	1,443	771	120	2.07%
Total	9,579	3,529	562	9.71%
Totals by Population				
Clackamas				7.77%
North Santiam				8.13%
McKenzie				9.50%

[1/] *Estimated release mortality rates are 10% in the lower Columbia recreational fisheries and 12.2% in the Willamette and tributary recreational fisheries. Release mortalities for commercial fisheries vary by gear type used (18.5% and 40%).*

[2/] *Aggregate wild return estimated at 5,787 adults at the mouth of the Columbia River (14% of the total 2007 Willamette spring Chinook adult run of 39,943). Wild return to the Clackamas River estimated at 1,228 adults (14% of the 8,469 Clackamas adult return).*

Table 13. Freshwater fishery percent impact on wild Willamette River spring Chinook, 1981-2007.

Fishery	1981-97	1998	1999	2000	2001[2/]	2002	2003	2004	2005	2006	2007
L. Col. Commercial [1/]	6.8	0.0	0.0	0.6	4.2	2.4	1.1	4.5	2.4	8.0	2.7
Sum	*6.8*	*0.0*	*0.0*	*0.6*	*4.2*	*2.4*	*1.1*	*4.5*	*2.4*	*8.0*	*2.7*
L. Col. Recreational	2.5	0.1	0.0	0.4	0.7	1.1	1.2	1.1	0.8	0.7	0.8
L. Willamette Recr.	21.7	6.3	10.2	14.0	2.1	3.0	2.4	2.9	3.7	4.3	4.2
L. Clackamas Recr.	22.9	26.5	22.8	13.6	1.5	4.9	0.8	0.3	0.6	0.3	0.1
U. Willamette Recr.	1.2	0.6	0.9	1.2	0.3	0.3	0.3	0.0	0.2	0.2	0.4
N. Santiam Recr.	16.5	22.7	21.7	2.0	2.5	0.4	0.1	0.4	0.1	0.2	0.1
McKenzie Recr.	5.1	0.0	0.0	0.0	1.0	0.0	5.4	2.1	0.9	1.3	1.5
Sum	*69.9*	*56.2*	*55.6*	*31.2*	*8.1*	*9.7*	*10.2*	*6.9*	*6.3*	*7.0*	*7.1*
Wild Harvest Rate	76.7	56.2	55.6	31.8	12.3	12.0	11.2	11.4	8.7	15.0	9.7
Totals by Population											
Clackamas	54.0	22.8	33.0	28.2	8.5	11.3	5.4	8.8	7.5	13.4	7.8
North Santiam	48.8	29.6	32.8	18.0	9.8	7.1	5.0	9.0	7.2	13.5	8.1
McKenzie	37.3	7.0	11.1	16.1	8.3	6.7	10.3	10.7	8.0	14.6	9.5

[1/] *Includes mainstem and SAFE salmon/sturgeon fisheries.*
[2/] *Rates for Upper Willamette, N. Santiam, and McKenzie for 2001 are assumed from Table 4 of the FMEP, ODFW 2001 page 28.*

2007 Total Wild Fish Impacts

The estimated wild fish impact totals by population from the 2007 freshwater fisheries are 7.8%, 8.1%, and 9.5% for the Clackamas, North Santiam, and McKenzie populations, respectively (Table 12). These estimates are below the 15% maximum limit established in the FMEP. Wild impact rates since 2001 have been much lower than the average rates of 37%-54% from 1981-1997 (Table 13).

Because estimates of wild fish handled in fisheries where catch is estimated by creel survey (or observer programs) are derived by assuming that 100% of released fish are wild, calculating the true number of wild fish handled by such fisheries is confounded by the presence of a small number of unmarked hatchery fish, which would be counted as wild. This would cause the handle and mortality of wild fish to be slightly overestimated, and would also slightly overestimate the abundance of wild fish. Whether these two effects cancel each other out, cause additive errors, or cause a directional bias has not been evaluated. The discontinuation of unclipped double-index tagging (DIT) releases in the Clackamas River may provide an opportunity to examine this issue in the Clackamas River fishery. Handle of wild fish estimated by encounter rates of hatchery fish calculated from angler catch cards should not be affected by the presence of DIT fish in the same way, but this method presents other difficulties that make the method less desirable for assessing wild fish impacts than are direct surveys, even considering the confounding issues of released DIT fish in surveyed fisheries.

Table 14. Run reconstructions for Willamette River wild spring Chinook, 2002-2007.

	Above Falls					Below Falls Fishery Mortalities					Columbia River Mouth
	Trib Return		Fishery Mortalities			Clack	LWR	LCR			
	McK	N Sant	MS Sant	MS Willam	Sum	Return	Sport	Comm	Sport	Sum	Return
2002	4,297	657	1	13	4,968	1,654	383	452	134	1,654	7,591
2003	5,777	846	1	16	6,640	2,796	367	261	178	2,796	10,242
2004	5,082	553	0	5	5,641	4,581	325	506	127	4,581	11,181
2005	3,011	681	1	12	3,704	2,045	226	148	48	2,045	6,171
2006	2,685	353	1	10	3,049	1,017	201	376	35	1,017	4,679
2007	3,874	220	1	22	4,117	1,228	241	153	48	1,228	5,787

2007 Angler Compliance With Regulations

Oregon State Police (OSP) Fish and Wildlife Division officers and their volunteers, with assistance from ODFW fish checkers and commercial fishery observers, enforce Willamette spring Chinook angling regulations. A priority task is enforcement of the regulation requiring release of non-adipose-fin-clipped spring Chinook in recreational and commercial fisheries. Compliance with this regulation is relatively high (personal communication, Lt. Dave Cleary, OSP, Salem).

Outlook for 2008 Willamette Spring Chinook Management

The 2008 Willamette spring Chinook run size forecast is for a total run of 34,050 fish, including 5,100 (15%) wild fish (Figure 2). The forecast includes 1,400 age-3 fish, 14,800 (44%) age-4 fish, 17,200 (51%) age-5 fish, and 650 age-6 fish. In December 2001, the Oregon Fish and Wildlife Commission established a long-term allocation plan between the lower Columbia commercial fishery and the recreational fishery below Willamette Falls (including the lower Columbia River) for sharing of the harvestable surplus of Willamette River hatchery spring Chinook. The allocations for 2008, based on the forecast of 28,950 hatchery fish, are 5,900 hatchery fish to the recreational fishery and 290 hatchery fish to the commercial fishery (Table 14). The 290 Willamette hatchery fish available for commercial fisheries are sufficient to allow for minimal bycatch of Willamette hatchery fish in mainstem sturgeon fisheries and in Select Area salmon fisheries; however, too few Willamette hatchery fish are available to allow commercial salmon target fisheries to occur in areas where they may harvest Willamette fish. The 2008 forecast for upriver Columbia spring Chinook is 269,300 fish. Given the disparity between the Willamette and Columbia forecasts, fisheries in 2008 will present unique challenges for fishery management, and the low Willamette return will be a constraining factor in managing mainstem Columbia and lower Willamette River fisheries. Fisheries managers will likely utilize unique combinations of time and area restrictions in commercial and recreational fisheries to maximize potential harvest of upriver hatchery stocks while minimizing impacts to Willamette stocks.

Mainstem and tributary spring Chinook fisheries will continue to be mark-selective for adipose fin-clipped fish in 2008. All Willamette Basin recreational fisheries are restricted to adipose fin-clipped fish under permanent rule, and regulations are printed as such in the *2008 Oregon Sport Fishing Regulations* pamphlet.

The lower Columbia spring Chinook recreational fishery is open under permanent regulations January 1 through March 31 of each year below the I-5 Bridge. For 2008, the fishery below I-5 will be managed primarily to constrain harvest of Willamette hatchery spring Chinook, and the permanent season may be modified to accomplish this. ODFW and WDFW fishery managers will meet at a Columbia River Compact hearing February 15, 2008 to establish the 2008 fishery structure. The majority of recreational fishing and harvest is expected to be restricted to the area above I-5 bridge, where catch of hatchery and wild Willamette Chinook is extremely low, and to the lower Willamette River below Willamette Falls. Restrictions on the Clackamas River fishery are unlikely.

The Columbia River commercial fishery will be set at the February 15, 2008 or subsequent Columbia River Compact hearings. The 2008 commercial fishery may include a mix of large-mesh gillnets to target spring Chinook and limit steelhead handling, and 4¼" mesh tangle nets to maximize release survival and harvest of marked hatchery Chinook. As part of permanent rules for the spring fishery, the commercial fishery will be required to use shortened nets with 45-minute maximum drift times. All lethargic or bleeding non-adipose-fin-clipped spring Chinook will be placed in on-board recovery boxes to be revived prior to release. ODFW and WDFW will monitor the fishery to estimate the effectiveness of fishing gear and catch of target and non-target fish. This fishery will be managed to have minimal impact on Willamette stock Chinook, and will be structured to focus on more abundant upriver spring Chinook. Because the Willamette FMEP specifies a very small allowable harvest of hatchery Willamette Chinook, 2008 commercial spring Chinook fisheries will be constrained to the area above the I-5 bridge, to minimize catch of Willamette fish.

Because of the above mentioned constraints on harvest of hatchery Willamette Chinook in 2008 fisheries, the cumulative freshwater fishery impact on Willamette wild spring Chinook is expected to be well below the maximum impact rate of 15% specified in the FMEP.

ODFW
January, 2008

Table 14. Willamette River spring Chinook allocation schedule.

Predicted Willamette Hatchery Run Size	Hatchery Fish Escapement Targets			Number of Hatchery Fish Available	Harvest Shares Below the Falls			
	Willamette Falls Escapement Target	Clackamas Escapement Target	Combined Escapement Target		Recreational		Commercial	
					Share	Catch	Share	Catch
23,000	20,000	3,000	23,000	0	<1%	<230	<1%	<230
24,000	20,000	3,000	23,000	1,000	100%	1,000	<1%	<240
25,000	20,000	3,000	23,000	2,000	100%	2,000	<1%	<250
26,000	20,000	3,000	23,000	3,000	100%	3,000	<1%	<260
27,000	20,000	3,000	23,000	4,000	100%	4,000	<1%	<270
28,000	20,000	3,000	23,000	5,000	100%	5,000	<1%	<280
29,000	20,000	3,000	23,000	6,000	100%	6,000	<1%	<290
30,000	20,000	3,000	23,000	7,000	100%	7,000	<1%	<300
31,000	20,000	3,000	23,000	8,000	100%	8,000	<1%	<310
32,000	20,000	3,000	23,000	9,000	100%	9,000	<1%	<320
33,000	20,000	3,000	23,000	10,000	100%	10,000	<1%	<330
34,000	20,000	3,000	23,000	11,000	100%	11,000	<1%	<340
35,000	20,000	3,000	23,000	12,000	100%	12,000	<1%	<350
36,000	20,000	3,000	23,000	13,000	100%	13,000	<1%	<360
37,000	20,000	3,000	23,000	14,000	100%	14,000	<1%	<370
38,000	20,000	3,000	23,000	15,000	100%	15,000	<1%	<380
39,000	20,000	3,000	23,000	16,000	100%	16,000	<1%	<390
40,000	22,000	3,300	25,300	14,700	85%	12,495	15%	2,205
41,000	22,000	3,300	25,300	15,700	85%	13,345	15%	2,355
42,000	22,000	3,300	25,300	16,700	85%	14,195	15%	2,505
43,000	22,000	3,300	25,300	17,700	85%	15,045	15%	2,655
44,000	22,000	3,300	25,300	18,700	85%	15,895	15%	2,805
45,000	22,000	3,300	25,300	19,700	80%	15,760	20%	3,940
46,000	22,000	3,300	25,300	20,700	80%	16,560	20%	4,140
47,000	22,000	3,300	25,300	21,700	80%	17,360	20%	4,340
48,000	22,000	3,300	25,300	22,700	80%	18,160	20%	4,540
49,000	22,000	3,300	25,300	23,700	80%	18,960	20%	4,740
50,000	24,000	3,600	27,600	22,400	76%	17,024	24%	5,376
51,000	24,000	3,600	27,600	23,400	76%	17,784	24%	5,616
52,000	24,000	3,600	27,600	24,400	76%	18,544	24%	5,856
53,000	24,000	3,600	27,600	25,400	76%	19,304	24%	6,096
54,000	24,000	3,600	27,600	26,400	76%	20,064	24%	6,336
55,000	24,000	3,600	27,600	27,400	76%	20,824	24%	6,576
56,000	24,000	3,600	27,600	28,400	76%	21,584	24%	6,816
57,000	24,000	3,600	27,600	29,400	76%	22,344	24%	7,056
58,000	24,000	3,600	27,600	30,400	76%	23,104	24%	7,296
59,000	24,000	3,600	27,600	31,400	76%	23,864	24%	7,536
60,000	26,500	4,000	30,500	29,500	73%	21,535	27%	7,965
61,000	26,500	4,000	30,500	30,500	73%	22,265	27%	8,235
62,000	26,500	4,000	30,500	31,500	73%	22,995	27%	8,505
63,000	26,500	4,000	30,500	32,500	73%	23,725	27%	8,775
64,000	26,500	4,000	30,500	33,500	73%	24,455	27%	9,045
65,000	26,500	4,000	30,500	34,500	73%	25,185	27%	9,315
66,000	26,500	4,000	30,500	35,500	73%	25,915	27%	9,585
67,000	26,500	4,000	30,500	36,500	73%	26,645	27%	9,855
68,000	26,500	4,000	30,500	37,500	73%	27,375	27%	10,125
69,000	26,500	4,000	30,500	38,500	73%	28,105	27%	10,395

Table 14 Continued, Next Page

Table 14. continued.

Predicted Willamette Hatchery Run Size	Hatchery Fish Escapement Targets			Number of Hatchery Fish Available	Harvest Shares Below the Falls			
	Willamette Falls Escapement Target	Clackamas Escapement Target	Combined Escapement Target		Recreational		Commercial	
					Share	Catch	Share	Catch
70,000	29,000	4,400	33,400	36,600	73%	26,718	27%	9,882
71,000	29,000	4,400	33,400	37,600	73%	27,448	27%	10,152
72,000	29,000	4,400	33,400	38,600	73%	28,178	27%	10,422
73,000	29,000	4,400	33,400	39,600	73%	28,908	27%	10,692
74,000	29,000	4,400	33,400	40,600	73%	29,638	27%	10,962
75,000	29,000	4,400	33,400	41,600	73%	30,368	27%	11,232
76,000	29,000	4,400	33,400	42,600	70%	29,820	30%	12,780
77,000	29,000	4,400	33,400	43,600	70%	30,520	30%	13,080
78,000	29,000	4,400	33,400	44,600	70%	31,220	30%	13,380
79,000	29,000	4,400	33,400	45,600	70%	31,920	30%	13,680
80,000	32,000	4,900	36,900	43,100	70%	30,170	30%	12,930
81,000	32,000	4,900	36,900	44,100	70%	30,870	30%	13,230
82,000	32,000	4,900	36,900	45,100	70%	31,570	30%	13,530
83,000	32,000	4,900	36,900	46,100	70%	32,270	30%	13,830
84,000	32,000	4,900	36,900	47,100	70%	32,970	30%	14,130
85,000	32,000	4,900	36,900	48,100	70%	33,670	30%	14,430
86,000	32,000	4,900	36,900	49,100	70%	34,370	30%	14,730
87,000	32,000	4,900	36,900	50,100	70%	35,070	30%	15,030
88,000	32,000	4,900	36,900	51,100	70%	35,770	30%	15,330
89,000	32,000	4,900	36,900	52,100	70%	36,470	30%	15,630
90,000	35,000	5,400	40,400	49,600	70%	34,720	30%	14,880
91,000	35,000	5,400	40,400	50,600	70%	35,420	30%	15,180
92,000	35,000	5,400	40,400	51,600	70%	36,120	30%	15,480
93,000	35,000	5,400	40,400	52,600	70%	36,820	30%	15,780
94,000	35,000	5,400	40,400	53,600	70%	37,520	30%	16,080
95,000	35,000	5,400	40,400	54,600	70%	38,220	30%	16,380
96,000	35,000	5,400	40,400	55,600	70%	38,920	30%	16,680
97,000	35,000	5,400	40,400	56,600	70%	39,620	30%	16,980
98,000	35,000	5,400	40,400	57,600	70%	40,320	30%	17,280
99,000	35,000	5,400	40,400	58,600	70%	41,020	30%	17,580
100,000	39,000	6,000	45,000	55,000	70%	38,500	30%	16,500
101,000	39,000	6,000	45,000	56,000	70%	39,200	30%	16,800
102,000	39,000	6,000	45,000	57,000	70%	39,900	30%	17,100
103,000	39,000	6,000	45,000	58,000	70%	40,600	30%	17,400
104,000	39,000	6,000	45,000	59,000	70%	41,300	30%	17,700
105,000	39,000	6,000	45,000	60,000	70%	42,000	30%	18,000
106,000	39,000	6,000	45,000	61,000	70%	42,700	30%	18,300
107,000	39,000	6,000	45,000	62,000	70%	43,400	30%	18,600
108,000	39,000	6,000	45,000	63,000	70%	44,100	30%	18,900
109,000	39,000	6,000	45,000	64,000	70%	44,800	30%	19,200
110,000	39,000	6,000	45,000	65,000	70%	45,500	30%	19,500

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